Master de Sciences et Technologies
Mention Biologie Intégrative et Physiologie
Parcours : Neurosciences
Responsable : Professeur Régis Lambert

Internship Proposal
Academic Year 2018-2019

1. Host team :

Research Unit (e.g. Department or Institute) : Institute of Ophthalmology "Conde de Valenciana Foundation" Research Unit
Research Unit Director : Yonathan Garfias, MD PhD
Research Team Director : Victor Manuel Bautista de Lucio, PhD
Team name : Microbiology and Ocular Proteomics

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2. Internship project title:

Identification of Protein biomarkers in tears of diabetic retinopathy by Mass Spectrometry Means

3. Internship Description :

Diabetic retinopathy (DR), a leading cause of acquired vision loss, is a microvascular complication of diabetes. While traditional risk factors for diabetic retinopathy including longer duration of diabetes, poor blood glucose control, and dyslipidemia are helpful in stratifying patient's risk for developing retinopathy, many patients without these traditional risk factors develop DR; furthermore, there are persons with long diabetes duration who do not develop DR. Thus, identifying biomarkers to predict DR or to determine therapeutic response is important. A biomarker can be defined as a characteristic that is objectively measured and evaluated as an indicator of normal biological processes, pathogenic processes, or pharmacologic responses to a therapeutic intervention. With the advancement of proteomics techniques such as mass spectrometry combined with the use of fractionation and separation of peptides and proteins as well as bioinformatics, possible biomarkers are being identified but their results have not been conclusive. Studies are required that include patients at different stages of the disease, primarily in the early stages, to identify candidate biomarkers for subsequent validation in a larger population sample. Ocular tears research is important to identify novel protein biomarkers of diabetic retinopathy, first because are non-invasive, cheapear and fast than other, and, also they can be used as a diagnostic, pronostic or therapeutic targes. The project that we developed at our lab has two objectives:

1. Identify and characterize protein biomarkers in tears by means of proteomic analysis.
   -Recovery of tears proteins from diabetic retinopathy patients
   -2D-gel electrophoresis of tears proteins
   -Analysis of differential protein expression

-Identification of proteins with differential expression by mass spectrometry

2. Validate protein biomarkers in tears in a population study.

1. M. Brownlee, “Biochemistry and molecular cell biology of diabetic complications,” Nature, vol. 414, no. 6865, pp. 813–820, 2001. **2.** Redl B. Human tear lipocalin. Biochim Biophys Acta 2000; 1482: 241-248. 19. de Souza GA, Godoy LM, Mann M. Identification of 491 proteins in the tear fluid proteome reveals a large number of proteases and protease inhibitors. Genome Biol 2006; 7: R72. **3.** Grus FH, Sabuncuo P, Dick HB, Augustin AJ, Pfeiffer N. Changes in the tear proteins of diabetic patients. BMC Ophthalmol 2002; 2: 4.